

oculation. The material for this purpose is obtainable from two general sources: (1) artificially prepared cultures and (2) field soil in which the proper bacteria are known to be present. It is possible by careful laboratory work to take the bacteria from nodules and to propagate them on sterilized artificial food in the absence of other bacteria. Inoculating material prepared in this manner is obtainable from various governmental and commercial agencies. On the other hand, soil known to contain the proper bacteria and free from diseases and pests, makes an excellent source of inoculating material for the farmer. At times it may be advisable to establish a source of bacteria on the farm by growing seed treated with pure culture on a small plot of soil. With this source at hand, the soil may be transferred to other fields as it is needed. When a soil is once seeded with the proper bacteria and it is maintained favorable to their growth with necessary additions of lime, fertilizers, and organic matter and an occasional growth of the legume on which they function, they should continue to live indefinitely in this soil.

After legume bacteria penetrate the roots they begin to draw nitrogen from the air and so alter it that the plant may absorb and utilize it in the building of tissues. While the bacteria are fixing nitrogen they draw on the plant roots for the carbohydrates, moisture, and minerals necessary for their growth. Through the work of these bacteria greater legume crops are produced, uniformly higher in nitrogen than most nonlegumes or legumes which do not have the benefit of this bacterial association.

Amount of Nitrogen Fixation Varies

The amount of nitrogen fixed by legumes and their bacteria varies with the species, the conditions, and the time of growth. Under favorable conditions a single crop of legumes may fix as much as 200 pounds nitrogen per acre in a year and a crop put on the soil to fill a gap for a short time may only add from 40 to 60 pounds per acre in a season. In the choice of legumes for planting, those which grow vigorously under the existing conditions and which meet the needs of the type of farming practiced should be considered.

The main part of the nitrogen fixed by legumes stays in the plant until it dies and decays, although in a dormant period of the plant or in extremely dry weather, a small amount of it may pass into the soil by the "sloughing off" of the nodules. The fate of the nitrogen in the legume crop is entirely dependent upon its utilization. The nitrogenous organic matter in the stubble as a rule remains in the soil where it rots and is thereby made available for subsequent non-legume crops. The greater part of the nitrogen in legumes is usually in the part that is cut for hay or seed.

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LIMEQUAT: A New Hardy Ade Fruit The peculiar zest of the juice of the West Indian lime makes it desirable that fruits of this type be grown over a much wider range than at present. Those familiar with citrus fruits know that the lime is the tenderest of all the commonly grown species of this group. It is frequently frozen severely even in southern

Florida, so that its culture is chiefly restricted to the keys along the Florida coast. It is not grown commercially in California at all.

In 1909, the senior writer originated a new type of citrus fruit by crossing the West Indian lime with the kumquat orange. The kumquat is one of the hardiest of the evergreen citrus fruit trees, and is also highly resistant to some of the diseases affecting the lime and other citrus varieties. The fruit, however, has little commercial value and is used chiefly for preserves, or for decorative purposes. These crosses resulted in a number of hybrids varying in character, but all producing fruits much like the lime in their acid quality.

The hybrid selected from among these as the most promising was the result of fertilizing the flowers of the common or West Indian

lime with pollen of the round or Marumi kumquat. Since the cross was made at Eustis, Fla., the fruit has been named the Eustis limequat. It is strikingly beautiful in appearance, resembling the lime in size and texture, but with a light yellow color like that of the grapefruit.

(Fig. 136.) It is thin-skinned but firm, very juicy, has few seeds, and the flavor, except when dead ripe, can scarcely be distinguished, even by an expert, from that of the true lime. The fruit develops its juice content while still green, so that, like the lime, it can and should

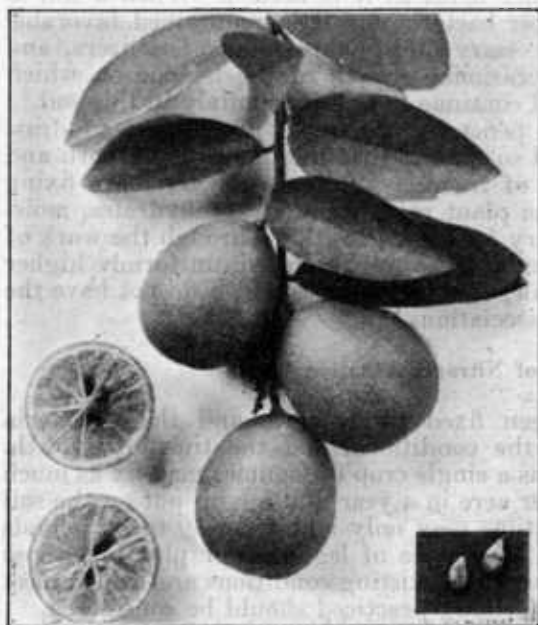


FIG. 136.—The Eustis limequat, natural size

be used while still partially green. The tree is evergreen, of rapid, upright growth, and with small, pointed leaves. The spines on the bearing twigs are very inconspicuous, a decided point in favor of this hybrid, contrasting with the viciously spiny character of the lime. The limequat is more or less everbearing, so that fruit is usually available for nearly six months of the year. It has proved itself adaptable over a wide range of territory, withstanding temperatures in northern Florida and Alabama as low as 17° F. without serious injury. Even where frozen back severely it usually makes a quick recovery and has the ability, like its kumquat parent, to produce fruit on new sprouts, so that a fair crop may be obtained even following a damaging freeze. While thus proven quite hardy, it also fruits well in warmer regions, being quite at home in southern Florida and even in tropical Honduras, where its vigor and freedom from disease furnishes a striking contrast to the

true lime. It is entirely immune from "lime wither tip," a disease very destructive to the common lime crop. For budding, it has proved adapted to all the common citrus stocks except the sour orange; and it may be grown by rooting cuttings. Although it does not come true from seed, selected seedlings may produce very excellent trees. Nursery propagation is confined largely to the rough lemon stock for the warmer sections and the trifoliate orange for colder areas. Most of the larger citrus nurseries have undertaken the propagation of the limequat within the last few years.

Aside from its use in making ades, the limequat is excellent for marmalade, for preserves, and in the crystallized form, since the rind, like that of the kumquat, is edible. California lemons are not to be had in Florida, owing to quarantine restrictions to prevent the possible introduction of brown rot, while Sicilian lemons are expensive and obtainable only in the larger towns. Thus it often happens that a good acid citrus fruit for ade making, salads, or for flavoring is actually a scarcity even in citrus-growing territory. A more extended planting of the limequat in home gardens and small groves will supply this deficiency to a large extent, and may lead to the development of a moderate demand in more distant markets.

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LIVESTOCK Estimating Work Much Enlarged The activities of the department in estimating livestock production have been greatly enlarged during the last four years. Prior to 1922 the principal estimates were of the numbers of animals on farms January 1 each year, number of brood sows April 1, number of stock hogs September 1, a partial estimate of livestock losses in April, and an estimate of wool production.

No attempt was made to estimate actual annual livestock production. The only measure was the change in inventory numbers as of January 1—admittedly a very inadequate basis. No official information was available to producers or to the trade in advance of the marketing period as to the size of the pig or lamb crops, number of cattle and sheep on feed for market, probable market supplies over seasonal periods, or condition of livestock to be marketed. Practically the only information as to these items was that coming through trade sources; this was fragmentary, unorganized, often conflicting and based largely on biased opinion evidence.

The following list of livestock reports now being issued or to be issued indicates the progress that has been made in furnishing needed information as to various phases of livestock production. Chronologically arranged, these reports are:

January

Annual inventory of numbers of livestock on farms by species, showing class and age separation.

Estimate of the amount and value of livestock production during the preceding year, with annual balance sheets showing items of increase and decrease.